

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

- 1-14. (Cancelled)
15. (New) A plastic recycling process, comprising:  
receiving a plastic-rich mixture;  
determining the plastic-rich mixture to have one or more properties;  
selecting one or more processes for processing the plastic-rich mixture, wherein the selection is based on the one or more properties of the plastic-rich mixture, the processes being selected from the group consisting of preprocessing operations, size reduction operations, gravity concentration operations, color sorting, sorting by thickness, friction, or differential terminal velocity or drag in air, surface to mass control operations, separation processes enhanced by narrow surface to mass distributions, blending operations, and extrusion and compounding operations;  
arranging the selected processes into a sequence of processes, wherein the sequence is based on the one or more properties;  
subjecting the plastic-rich mixture to the sequence of processes; and  
collecting a recycled plastic material as an output of the sequence of processes.
16. (New) The process of claim 15, wherein:  
selecting the processes includes determining a desired recycled plastic material and selecting the processes to cause the recycled plastic material to include the desired recycled plastic material.

17. (New) The process of claim 15, wherein:  
selecting the one or more processes includes selecting at least four processes.
18. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to the sequence of processes includes separating the plastic-rich mixture into different grades of plastic material.
19. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to the sequence of processes includes separating the plastic-rich mixture into different types of plastic material.
20. (New) The process of claim 15, further comprising:  
selecting the plastic-rich mixture from a source selected from the group consisting of white goods, office automation equipment, consumer electronics, automotive shredder residue, packaging waste, household waste, building waste, industrial molding and extrusion scrap according to one or more desired properties of the recycled plastic material.
21. (New) The process of claim 15, further comprising:  
selecting the plastic-rich mixture based on a geographic location of origin of the plastic-rich mixture.
22. (New) The process of claim 15, wherein:  
selecting the plastic-rich mixture includes determining one or more desired properties of the recycled plastic material.
23. (New) The process of claim 15, wherein:  
one or more of the processes is repeated in the sequence of processes.

24. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes blending two or more materials to obtain a desired property in the recycled plastic material, wherein at least one of the materials is a product of one of the processes.
25. (New) The process of claim 15, further comprising:  
compounding the recycled plastic material with one or more additives.
26. (New) The process of claim 15, wherein:  
collecting a recycled plastic material as an output of the sequence of processes includes collecting a plurality of recycled plastic materials.
27. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes reducing the average size of plastic particles in the sequence of processes from about 75 mm to less than about 8 mm.
28. (New) The process of claim 27, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes reducing the average size of plastic particles in the sequence of processes over a plurality of processes in the sequence of processes.
29. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a preprocessing operation before a size reduction operation.

30. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a preprocessing stage including air aspiration.
31. (New) The process of claims 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to one or more wet granulation size reduction operations.
32. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to one or more gravity concentration operations.
33. (New) The process of claim 32, wherein:  
subjecting the plastic-rich mixture to one or more gravity concentration operations includes subjecting the plastic-rich mixture to a gravity concentration operation using solid particle media.
34. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to one or more truncated cone hydrocyclones or elutriators to remove metal or non-target plastics from the plastic mixture.
35. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to an arrangement of three consecutive gravity operations.

36. (New) The process of claim 35 wherein:

subjecting the plastic-rich mixture to an arrangement of three consecutive gravity concentration operations includes subjecting the plastic rich mixture to a modified hydrocyclone to remove metal, a modified hydrocyclone to remove high density plastics and a hydrocyclone to separate low from medium density plastics.

37. (New) The process of claim 15, wherein:

receiving a plastic-rich mixture includes receiving a plastic-rich mixture including HIPS, ABS and SAN;

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a gravity concentration operation to create a first stream having a higher percentage of HIPS than the plastic-rich mixture and a second stream having a higher percentage of ABS and SAN than the plastic-rich mixture and the first stream.

38. (New) The process of claim 15, wherein:

receiving a plastic-rich mixture includes receiving a plastic-rich mixture including a first grade of a first plastic type and a second grade of the first plastic type; and

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a gravity concentration operation to create a first product stream and a second product stream, wherein the first product stream has a higher percentage of the first grade of the first plastic type than the plastic-rich mixture and the second product stream has a higher percentage of the second grade of the first plastic type than the plastic-rich mixture and the first product stream.

39. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to sorting by thickness or friction.

40. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a sliding chute device that removes rubber.

41. (New) The process of claim 15, wherein:  
receiving a plastic-rich mixture includes receiving a plastic-rich mixture including HIPS and one or more of PP, ABS, general purpose PS or contaminants;  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to sorting by thickness or friction; and  
collecting a recycled plastic material includes collecting a stream including a higher percentage of HIPS than the plastic-rich mixture and one or more streams including PP, ABS, general purpose PS, or contaminants.

42. (New) The process of claim 15, wherein:  
receiving a plastic-rich mixture includes receiving a plastic rich mixture including ABS and one or more of SAN, HIPS or contaminants;  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to sorting by thickness or friction; and  
collecting a recycled plastic material includes collecting a stream including a higher percentage of ABS than the plastic-rich mixture and one or more streams including SAN, HIPS or contaminants.

43. (New) The process of claim 15, wherein:  
subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a surface to mass control operation.

44. (New) The process of claim 43, wherein:

subjecting the plastic-rich mixture to a surface to mass control operation includes one or more of a size reduction operation, an air aspiration, sorting using thickness or friction, a roll sorter, or a combination thereof.

45. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a gravity concentration operation to create one or more streams of plastic material, followed by a triboelectrostatic separation of one of the one or more streams of plastic material.

46. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a surface to mass separation process to recover a plurality of products and subjecting at least one of plurality of products to triboelectrostatic separation.

47. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a triboelectrostatic separation.

48. (New) The process of claim 47, wherein:

subjecting the plastic-rich mixture to a triboelectrostatic separation includes subjecting the plastic-rich mixture to a triboelectrostatic separation in which a charge mediating material is added.

49. (New) The process of claim 47, wherein:

subjecting the plastic-rich mixture to a triboelectrostatic separation includes tuning a triboelectrostatic separator, including selecting a geometry of the triboelectrostatic separator,

selecting a charge of charge plates of the triboelectrostatic separator, selecting an angle of the charge plates, or selecting a voltage applied to the charge plates.

50. (New) The process of claim 47, wherein:  
subjecting the plastic-rich mixture to a triboelectrostatic separation includes  
subjecting the plastic-rich mixture to two or more triboelectrostatic separators in series.

51. (New) The process of claim 47, wherein:  
subjecting the plastic-rich mixture to a triboelectrostatic separation includes  
feeding one or more product streams from a first stage triboelectrostatic separator back into the  
first stage triboelectrostatic separator.

52. (New) The process of claim 47, wherein:  
subjecting the plastic-rich mixture to a triboelectrostatic separation includes  
feeding one or more product streams from a second stage triboelectrostatic separator to a first  
stage triboelectrostatic separator.

53. (New) The process of claim 47, wherein:  
subjecting the plastic-rich mixture to a triboelectrostatic separation includes  
subjecting one or more product streams from a triboelectrostatic separator to a surface to mass  
control operation, followed by subsequent a triboelectrostatic separation.

54. (New) The process of claim 15, wherein:  
receiving a plastic-rich mixture includes receiving a mixture of ABS and HIPS;  
and  
collecting a recycled plastic material includes collecting a first output and a  
second output, wherein the first output has a higher percentage of ABS than the plastic-rich  
mixture and the second output has a higher percentage of HIPS than the plastic-rich mixture.



55. (New) The process of claim 15, wherein:

receiving a plastic-rich mixture includes receiving a mixture including a first plastic type, wherein a first portion of the first plastic type has a first property and a second portion of the first plastic type has a second property; and

collecting a recycled plastic material includes collecting a first output and a second output, wherein the first output includes a higher percentage of the first plastic type than the plastic-rich mixture and the second output includes a higher percentage of the second plastic type than the plastic-rich mixture and the first output.

56. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a process that separates the plastic-rich mixture into a plurality of product streams including a first stream of a first plastic type having a first surface to mass and a second stream of the first plastic type having a second surface to mass and blending the first and second streams to combine the first stream with the second stream.

57. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a triboelectrostatic separation; and

collecting a recycled plastic material includes collecting a first output and a second output, wherein the first output includes ABS and the second output includes SAN, the first output has a lower percentage of SAN than the second output and the second output has a lower percentage of ABS than the first output.

58. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a blending operation that combines a first stream including ABS with a second stream including SAN.

59. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a triboelectrostatic separation to separate PC and ABS from flame retarded ABS subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a triboelectrostatic separation to separate a PC/ABS blend from flame retarded ABS.

60. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a triboelectrostatic separation to separate flame retarded HIPS from non-flame retarded HIPS.

61. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to a blending operation.

62. (New) The process of claim 15, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes subjecting the plastic-rich mixture to extrusion compounding.

63. (New) The process of claim 62, wherein:

subjecting the plastic-rich mixture to extrusion compounding includes subjecting the plastic-rich mixture to extrusion compounding with screen packing.

64. (New) The process of claim 62, wherein:

subjecting the plastic-rich mixture to extrusion compounding includes subjecting the plastic-rich mixture to extrusion compounding with two or more stages of screen packing with increasingly finer mesh screening.

65. (New) The process of claim 15, wherein:

receiving a plastic-rich mixture includes receiving a plastic containing bromine;

and

collecting a recycled plastic material includes collecting a first output including at least a portion of the plastic containing bromine and collecting a second output substantially free of the plastic containing bromine.

66. (New) The process of claim 65, wherein:

subjecting the plastic-rich mixture to a sequence of processes includes one or more of gravity concentration, color sorting, detecting and selectively ejecting materials containing bromine, triboelectrostatic separation or thickness sorting.

67. (New) The process of claim 15, wherein:

collecting a recycled plastic material includes collecting engineering thermoplastics.

68. (New) The process of claim 15, wherein selecting the one or more processes and arranging the selected processes into a sequence of processes creates the sequence of processes to include:

a preprocessing operation, followed by a size reduction operation, followed by a gravity concentration operation, followed by a triboelectrostatic separation.

69. (New) The process of claim 15, wherein selecting the one or more processes and arranging the selected processes into a sequence of processes creates the sequence of processes to include:

a size reduction operation, followed by a gravity concentration operation, followed by a triboelectrostatic separation.

70. (New) The process of claim 15, wherein selecting the one or more processes and arranging the selected processes into a sequence of processes creates the sequence of processes to include:

a preprocessing operation, followed by a size reduction operation, followed by a gravity concentration operation, followed by a triboelectrostatic separation.

71. (New) The process of claim 15, wherein selecting the one or more processes and arranging the selected processes into a sequence of processes creates the sequence of processes to include:

a size reduction operation, followed by a gravity concentration operation, followed by a surface to mass control operation, followed by a triboelectrostatic separation.